

**Amendments to the Claims:**

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A holographic recording method for irradiating a recording layer of a holographic recording medium with an object beam and a reference beam through an object optical system and a reference optical system, respectively, so that a data page is recorded thereon in the form of interference fringes, the method comprising:

exercising control so that the object beam in the object optical system is reflected in an exposure direction so as to be incident on the holographic recording medium or in a non-exposure direction so as not to be incident on the holographic recording medium selectively pixel by pixel in accordance with the data page to be ~~recorded~~; and recorded, making  $(N + 1)$  levels of gradation exposure by the object beam with a single exposure time  $t_1$  given by dividing  $t_0$  by  $N$ , where  $t_0$  is an exposure time necessary for exposing an area of the recording layer corresponding to a single pixel of the data page as much as approximately 100%, and  $N$  is an integer of not less than ~~2-2~~; and

exposing the area as much as approximately 100% by exposure of  $N$  times, as much as 0 by exposure of 0 times and as much as over 0 and under 100% by exposure of between 1 and  $(N-1)$  times.

2. (Original) The holographic recording method according to claim 1, wherein the reflection of the object beam in the exposure direction or in the non-exposure direction is controlled pixel by pixel by using a micromirror device having an array of micromirrors corresponding to the respective pixels of the data page, the micromirrors being switchable and controllable in the direction of reflection.

3. (Original) The holographic recording method according to claim 1, wherein

the object beam is pulsed to make a pulsed exposure for the single exposure time  $t_1$  by means of any one of: pulsed light emission from a light source of the object beam and the reference beam; intermittent interruption of an optical path of the object beam; and intermittent interruption of source light of the object beam and the reference beam.

4. (Original) The holographic recording method according to claim 2, wherein the object beam is pulsed to make a pulsed exposure for the single exposure time  $t_1$  by means of any one of: pulsed light emission from a light source of the object beam and the reference beam; intermittent interruption of an optical path of the object beam; and intermittent interruption of source light of the object beam and the reference beam.

5. (Previously Presented) The holographic recording method according to claim 1, wherein:

a beam intensity distribution of the object beam immediately before the reflection is divided into  $(N + 1)$  levels of areas; and the number of times of exposure for the time  $t_1$  within the exposure time  $t_0$  is controlled with respect to each of the areas so that the object beam after the reflection has a generally-uniform beam intensity distribution.

6. (Currently Amended) A holographic recording apparatus comprising: a laser light source; a first polarizing beam splitter for splitting a laser beam from this laser light source into an object beam and a reference beam; an object optical system for introducing the object beam to a holographic recording medium; and a reference optical system for introducing the reference beam to the holographic recording medium, wherein

the object optical system includes: a second polarizing beam splitter for transmitting or reflecting the object beam; a reflection type spatial light modulator capable of intensity-modulating the object beam transmitted through this second polarizing beam splitter with respect to each of pixels of a data page to be recorded, and reflecting it in an exposure direction toward the second polarizing beam splitter or in a non-exposure direction different

thereto selectively; and a quarter-wave plate arranged on an optical path between the second polarizing beam splitter and the reflection type spatial light modulator,

the object beam reflected by the reflection type spatial light modulator and the second polarizing beam splitter interferes with the reference beam in the holographic recording medium, and

the reflection type spatial light modulator is configured so that it is capable of at least  $N$  times of reflection within an exposure time  $t_0$ , where  $t_0$  is the exposure time necessary for exposing an area of the recording layer by the object beam corresponding to a single pixel of the data page as much as approximately 100%, a single exposure time  $t_1$  is given by dividing  $t_0$  by  $N$ , ~~and~~  $N$  is an integer of not less than 2; and

exposing the area as much as approximately 100% by exposure of  $N$  times, as much as 0 by exposure of 0 times and as much as over 0 and under 100% by exposure of between 1 and  $(N-1)$  times.

7. (Original) The holographic recording apparatus according to claim 6, wherein the reflection type spatial light modulator is made of a micromirror device having an array of micromirrors corresponding to the respective pixels of the data page, the micromirrors being switchable and controllable in a direction of reflection.

8. (Previously Presented) The holographic recording apparatus according to claim 6, wherein

the laser light source is configured so that the laser light source is capable of pulsed light emission with generally the same pulse width as the single exposure time  $t_1$  of the reflection type spatial light modulator.

9. (Previously Presented) The holographic recording apparatus according to claim 6, wherein

beam interrupting means for transmitting laser light with generally the same pulse width as the single exposure time  $t_1$  of the reflection type spatial light modulator and interrupting it between pulses is interposed between the laser light source and the first polarizing beam splitter.

10. (Previously Presented) The holographic recording apparatus according to claim 6, comprising a control unit for controlling the number of times of exposure within the exposure time  $t_0$  with respect to each of the pixels of the reflection type spatial light modulator, and wherein

the control unit is configured to control the number of times of exposure within the exposure time  $t_0$  pixel by pixel so that a beam intensity distribution after the reflection by the reflection type spatial light modulator becomes generally uniform.

11. (Original) The holographic recording apparatus according to claim 8, comprising a control unit for controlling the number of times of exposure within the exposure time  $t_0$  with respect to each of the pixels of the reflection type spatial light modulator, and wherein

the control unit is configured to control the number of times of exposure within the exposure time  $t_0$  pixel by pixel so that a beam intensity distribution after the reflection by the reflection type spatial light modulator becomes generally uniform.

12. (Original) The holographic recording apparatus according to claim 9, comprising a control unit for controlling the number of times of exposure within the exposure time  $t_0$  with respect to each of the pixels of the reflection type spatial light modulator, and wherein

the control unit is configured to control the number of times of exposure within the exposure time  $t_0$  pixel by pixel so that a beam intensity distribution after the reflection by the reflection type spatial light modulator becomes generally uniform.

13. (Original) The holographic recording apparatus according to claim 10, wherein the control unit is configured to control the number of times of exposure so that the object beam after the reflection becomes generally uniform in beam intensity, based on beam intensity distribution information on each area when the beam intensity distribution of the object beam immediately before incident on the reflection type spatial light modulator is divided into  $(N + 1)$  levels of areas.

14. (Original) The holographic recording apparatus according to claim 11, wherein the control unit is configured to control the number of times of exposure so that the object beam after the reflection becomes generally uniform in beam intensity, based on beam intensity distribution information on each area when the beam intensity distribution of the object beam immediately before incident on the reflection type spatial light modulator is divided into  $(N + 1)$  levels of areas.

15. (Original) The holographic recording apparatus according to claim 12, wherein the control unit is configured to control the number of times of exposure so that the object beam after the reflection becomes generally uniform in beam intensity, based on beam intensity distribution information on each area when the beam intensity distribution of the object beam immediately before incident on the reflection type spatial light modulator is divided into  $(N + 1)$  levels of areas.